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Economic Determinants of Latin American Defense Expenditures Revisited

by

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Introduction

Despite a tradition of military governance, Latin America allocates a comparatively small portion of GNP to military expenditures. Historically, Latin America spends less than any other region in the world, averaging around 2% or less of GNP (Figure 1). Because this ratio has been relatively stable, several empirical studies, including our earlier work (Looney and Frederiksen, 1988, and Looney and Frederiksen, 1990) have begun with the proposition that resource linkages to defense allocations in Latin America and other regions in the developing world dominate geo-political factors. Specifically, our findings suggested that in the case of Latin America the allocation of resources to defense is driven primarily by underlying changes in economic factors. This finding was confirmed in a later more comprehensive study (Hewitt, 1991) of defense expenditures throughout the developing world.

Due to data available at the time, that study was confined to the period 1970-1983. Subsequently, the region has undergone both sweeping economic and political changes. In addition, several new statistical techniques, in particular co-integration analysis, have been developed that have the potential to better identify the dynamics of defense expenditures.

Taking these developments into account, the purpose of this study is assess the extent to which economic factors have accounted for the region's defense allocations in the 1980s and into the 1990s. Have other factors increased in importance and if so to what extent? Is there a common pattern that characterizes most of the region's countries, or are national experiences so varied that generalizations are impossible? Hopefully, this analysis will also shed some light on the controversies surrounding the causes of Latin American defense expenditures during the 1980s and into the 1990s.

Previous Studies

In our earlier study of 10 Latin American countries, we hypothesized four alternative budgetary models. Model I, military budgets simply depend on the current GDP and the government's current fiscal position. In Model II, military spending depends on last year's GDP and the country's fiscal position. This reflects a situation where a government—for whatever reason—reacts more slowly in altering defense budgets in response to changes in constraints. Model III mirrors model I except that the impact of changes in the government's fiscal position affect military budgets over time; that is a country might commit itself to multiyear military programs. Finally, Model IV is similar to Model II, but also incorporates more stability in defense expenditures by incorporating last years defense expenditures in addition to GNP and the fiscal situation.

We found that a large proportion of the variability in Latin American defense expenditures could be explained by economic variables: the overall constraint (GDP) and fiscal funding variables (primarily government expenditures and or fiscal revenues). While this information is insightful, we concluded that it was of little help when forecasting military expenditures on a country-by-country basis. Specifically, by focusing on a narrow set of economic variables we were not able to unambiguously isolate a unique set of fiscal linkages leading to alterations in allocations to the military. Furthermore, military expenditures in several countries could be explained equally well by one or more of the models. Perhaps more importantly, we found it difficult to explain why one mechanism was operative while another was not. Why, for example, did Model I explain Ecuadorian defense expenditures better than say Model II?

Alternative Explanations for the Patterns of the 1980s

Another difficulty with our approach is that it did not explain the 1980s as well as we would have liked. While it is true that a rough link to economic resources appears to have continued into this period, the ratio of defense as a percentage of Gross National Product (GNP) actually rose slightly (Figure 1). A more likely prediction of our model was that national defense expenditures for most countries would have declined roughly in line with their falling Gross Domestic Products (GDP), thus maintaining its historic constant share of resources.

Budgetary Intertia

While a rising share of defense in GNP is not inconsistent with out model, its explanation requires a somewhat fortuitous set of circumstances—a distributed lag function of defense to resources such that the inertia in reformulating defense budgets results in military cuts responding very slowly to a declining resource base. Because the share of defense in national budgets declined during this period (Figure 2), this approach also requires a set of budget priorities whereby defense contracts at a faster rate than several of the main expenditure categories. There is empirical evidence that this can occur. For example, Hicks and Kubisch (1984) found that in countries experiencing a decline in real government expenditures defense was more vulnerable to cuts than social sectors (but less than production and infrastructure expenditures).

Residual Military Influence

Clearly, the 1980s brought two sets of changes to Latin America that were not present during the time period of our earlier study: (1) the shift from military governments and (2) constrained economic growth. This has led to the theory of residual military influence (Franko 1994) which stressed the ability of the Latin American military establishments to maintain their budgets during periods of economic decline and democratic transition. This phenomena would also account for the rising share of defense in GNP during the 1980s. It would not, however account for the fall in the share of defense in central government's budgets (Figure 2). However, one could always argue that the defense share might have fallen even further (as in developing countries) if the military had not resisted even more severe cuts. Establishing a counterfactual in these situations is always difficult.

Regional/Internal Conflict

During the 1980s many countries experienced internal conflicts and/or potential regional threats. This was particularly the case in Central America but other areas, such as the Andean countries, also faced situations requiring the maintenance or expansion of defense allocations. This explanation is consistent with the rise in the early to mid-1980s of armed forces (Figure 3) and armed imports (Figure 4) as a share of total imports. However, this approach appears at odds with the fall in the defense share of the budget during this period.

Multi-Factor

These are countries which may experience combinations of two or more sets of forces at work at any given time and or/over time.

Given the possibility of each of these mechanisms occurring in individual countries, it is always possible that a final explanation for the observed regional patterns is they have no real meaning and only mask great differences in individual countries. This was found in an earlier study of (Looney 1986) of budgetary priorities in the region where the tradeoffs between defense and non-defense allocations were found to vary considerably depending on whether the country was an arms or non-arms producer. If this is the case, the aggregate figures provide no real insights as to the budgetary process occurring during this period.

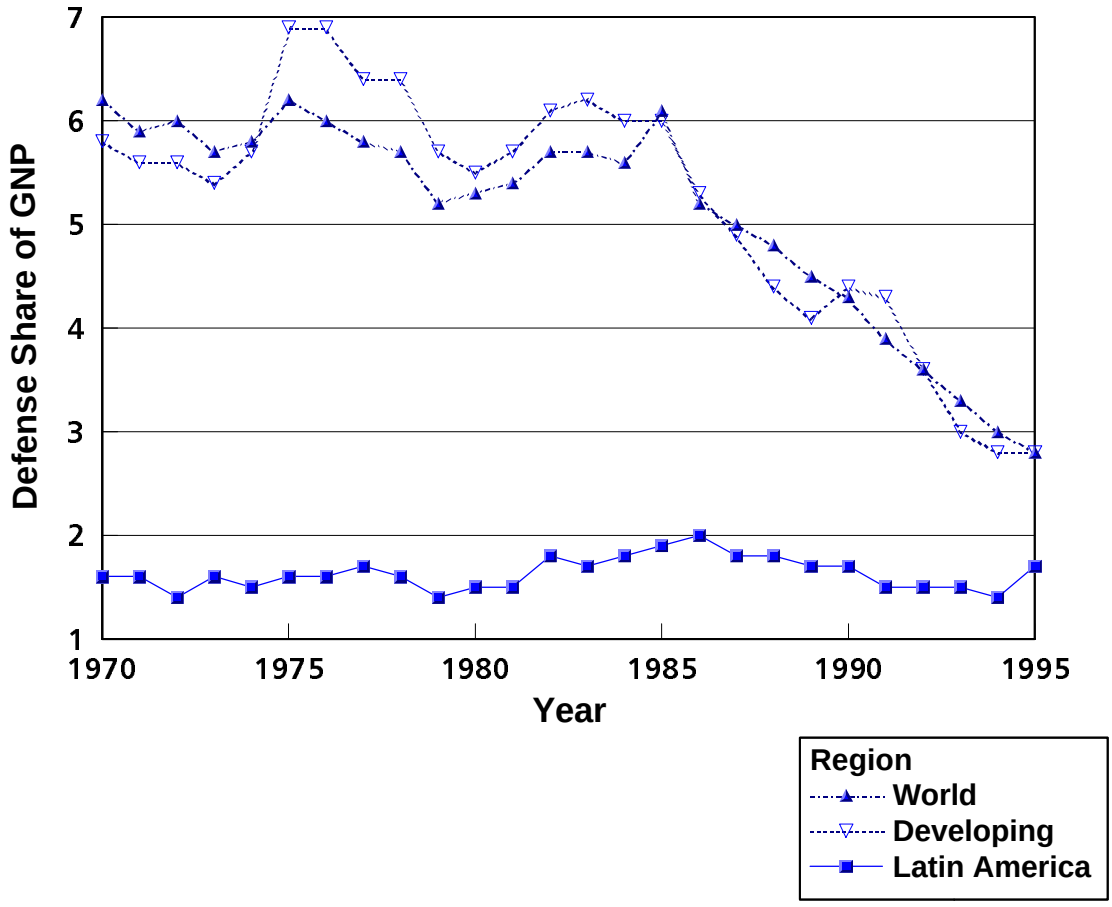
Methodology

Summing up, there appear to be several mechanisms, both political, budgetary/economic and strategic/threat that might possibly explain the observed pattern of Latin American defense expenditures during the 1980s. Identifying the operative mechanism is difficult, however, due to the fact that for many countries the political (military/civilian) cycle overlapped with the economic (growth/austerity) cycle. Another problem of interpreting patterns such those depicted in Figures 1-4 is that we are unsure of the length of time it takes for change, in say GNP, to result in significant budgetary consequences i.e. the lag structure of these relationships is not obvious. Clearly, many changes impact over periods of time rather instantaneously. For example the shift from a military to civilian government may result in subtle

modifications, of defense expenditure years out into the future, rather than a sharp break with past patterns.

Figure 1

Share of Defense Expenditures in GNP, 1970-1995



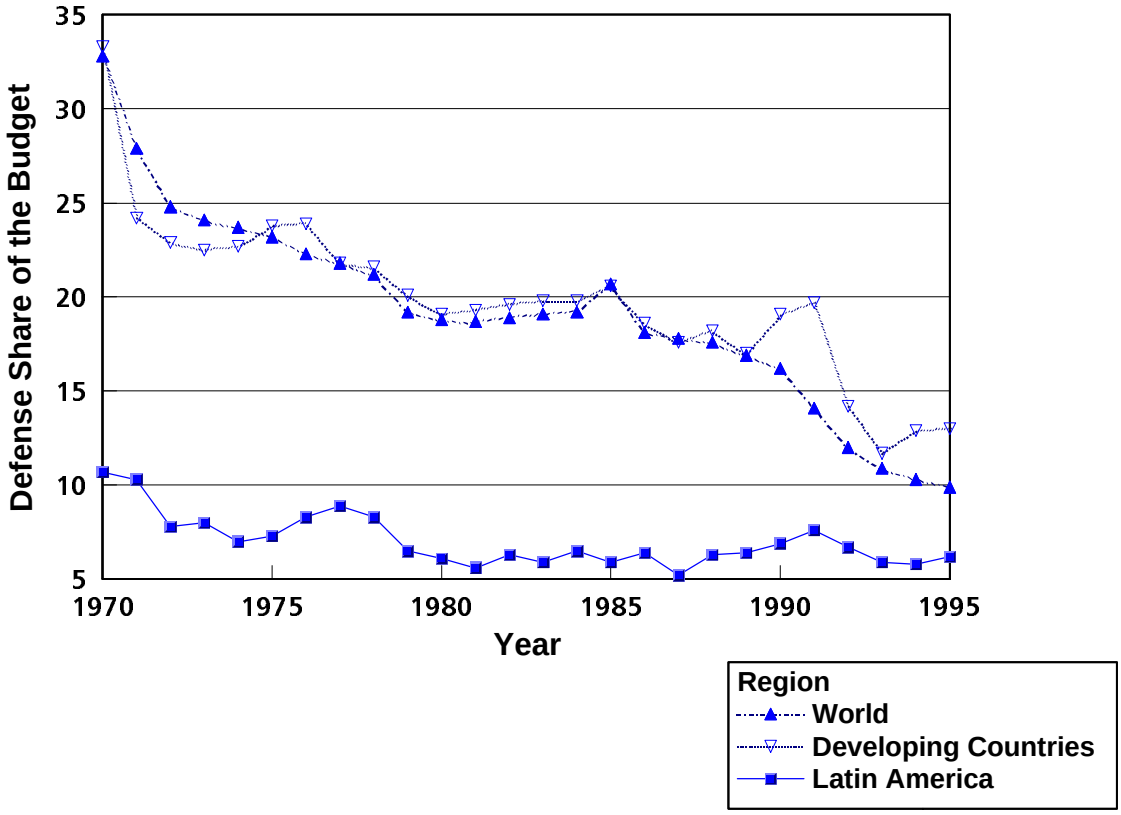
Main features:

- Although gap is closing, regional expenditures much lower than other parts of the developing world.
- High degree of relative stability over time—have not declined as in other parts of the world
- Rising share of resources (GNP) allocated to defense during the 1980s

Source: US. Arms Control and Disarmament Agency (1996) and various issues.

Figure 2

Share of Defense Expenditures in the Central Government Budget, 1970-1995



Main features:

- Patterns somewhat similar to that of the share of defense in GNP, with the Latin American ratio considerably below that in the world as a whole or developing countries in particular.

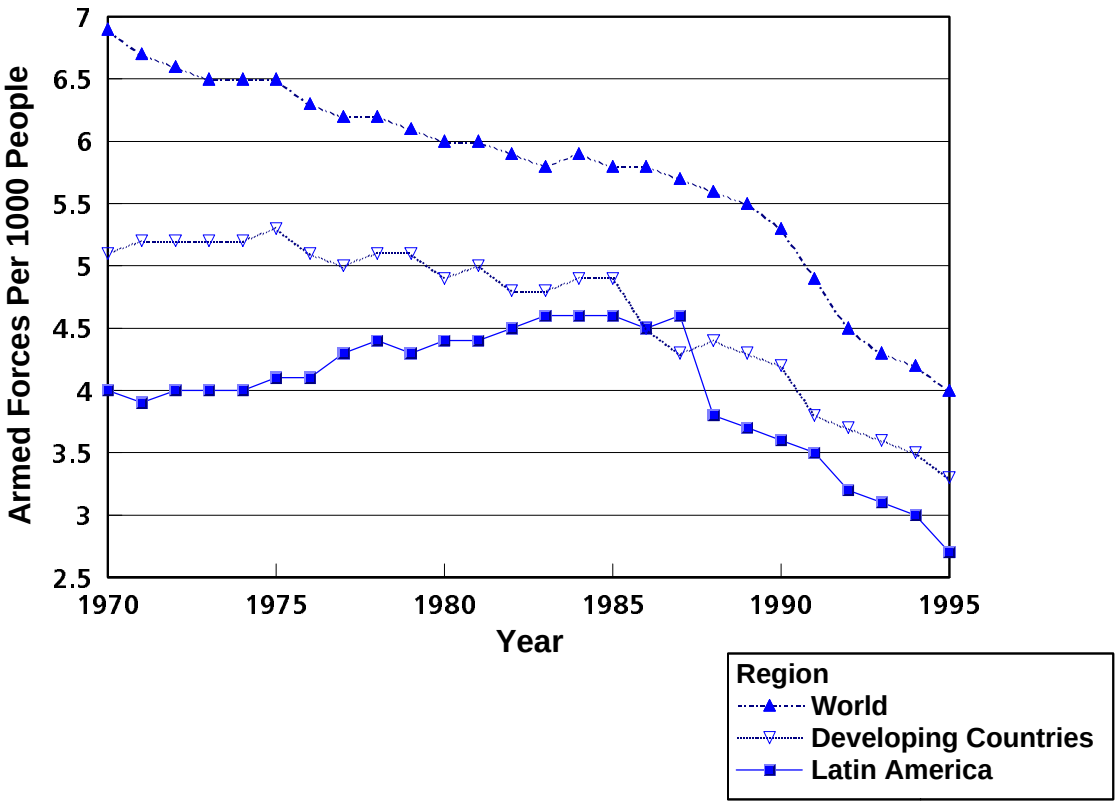
- As with the share of defense in GNP there has been no marked downward trend in Latin America,. In contrast this ratio has fallen fairly steadily throughout the period under consideration in both the world and developing countries.

- In contrast to the share of defense in GNP, defense share of the budget fell in the 1980s.

Source: US. Arms Control and Disarmament Agency (1996) and various issues.

Figure 3

Armed Forces Per 1000 People: 1970-1995



Main features:

- In contrast to the share of resources allocated to the military, the proportion of the population in the armed forces has been declining in recent years. Here Latin America follows a pattern resembling more closely that of other developing countries. Specifically:

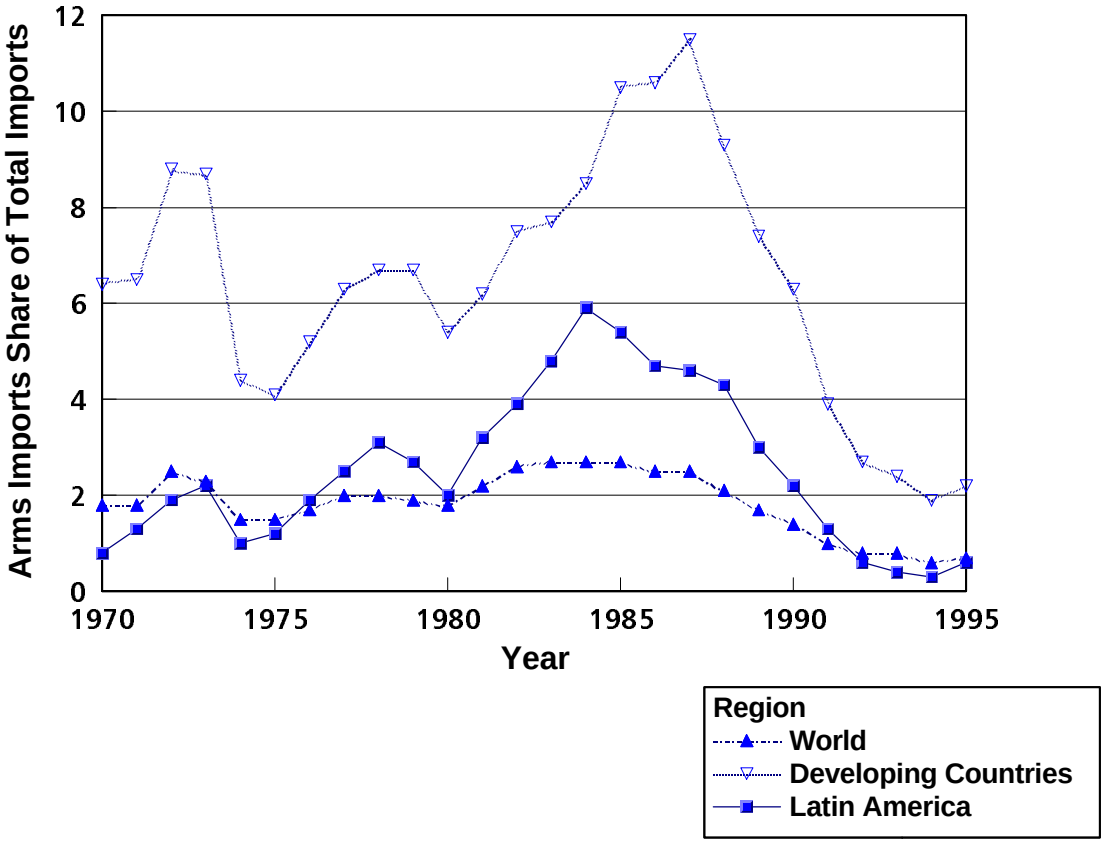
- The share of armed forces in the total population is much closer to that of other developing countries than the case of the share of defense in GNP.

- This share has been declining in both regions since the mid 1980s, although this decline began around 1975 in the developing countries.

Source: US. Arms Control and Disarmament Agency (1996) and various issues.

Figure 4

Share of Arms Imports in Total Imports, 1970-1995



Main features:

- The Latin American share of arms imports is total imports is also considerably lower than that in developing countries as a whole.

- Still the pattern of movement of the arms imports share in Latin America mirrors that of developing countries. Specifically:

- Beginning around 1975 a general increase in this share took place until the mid- (Latin America) and late- (developing countries) 1980s.

- Subsequently, both regions experienced a rapid deceleration in the share of imports accounted for by arms imports.

Source: US. Arms Control and Disarmament Agency (1996) and various issues.

Statistical Methods

In short, standard regression analysis may have limited value in identifying the budgetary patterns in Latin America. High R^2 values may arise as result of correlated trends and not through economic relationships. The standard method of overcoming this problem is to see whether the relationship discovered in levels persists after first differencing the variables. The problem with such an approach is that it involves the loss of low frequency (long-run) information. The assertion that there is a long-run relationship between defense expenditures and the level of economic activity in the Latin American countries necessitates the use of an econometric methodology that overcomes the problem of spurious regressions.

In this regard, cointegration and error correction modeling (ECM) allow the identification of non-spurious relationships without forcing the loss of long-run information. Moreover, ECM allows for suitable economic interpretations since it incorporates equilibrium relationships, along with the possibility of variables responding to short-run disequilbirum. The concept of cointegration provides the link between integrated processes and the concept of equilibrium. It was originally developed by Granger (1981) and extended by Engle and Granger (1987). The mathematics of this approach is outlined in Appendix A. The technique has been successfully applied to defense budgetary problems (Looney 1998):

In our problem, error correction can be viewed as a way budgetary adjustments occur over time. For example, if countries try to maintain some sort of long-run balance between defense and the resource base and defense expenditures rise above this level (perhaps due to a recession), then over time defense expenditures will decelerate to restore this balance. Other variables such as a change in the military's influence over government policy or increased military expenditures in the region may also form long-run relationships with defense. In this case they may adjust in the short-run to a disequilibrium in this long-run relationship. In this sense they can be interpreted as long-run forcing variables for the explanation of defense expenditures and other allocations to the military. The signs of the ECM term tell us how they do so.

Military Intervention Index

A key element in the analysis is the influence of the military over budgetary decisions. This is a subtle concept and can not be simply identified by classifying the government as civilian or military. In this study we use changes in the level of military influence—as measured by Putnam's (1967) Index of Military Intervention (MI) and updated by Dix (1994). Putnam's approach was to give each country a rating based on the extent of military intervention in the life of the country for that year (Putnam, 1967, 89). The rating (Table 1) runs from 0 (the military is essentially apolitical) to 3 (in which the military, or a military leader, rules directly and civilian actors are reduced to being supplicants of the military). These ratings are necessarily judgmental and have

been interpreted here as a proxy, reflecting the influence the military has over the defense allocation process.

Table 1

Military Intervention (MI) Scores: Latin America, 1996-1997

Year	Argentina	Bolivia	Brazil	Chile	Colombia	Costa Rica	Dominican Republic	Ecuador
1966	2	3	3	1	1	0	2	2
1967	3	3	3	1	1	0	2	2
1968	3	3	3	1	1	0	2	2
1969	3	2	3	1	1	0	2	2
1970	3	3	3	1	1	0	2	2
1971	3	3	3	1	1	0	2	2
1972	3	3	3	2	1	0	2	3
1973	3	3	3	3	1	0	2	3
1974	2	3	3	3	1	0	2	3
1975	2	3	3	3	1	0	2	3
1976	2	3	3	3	1	0	2	3
1977	3	3	3	3	1	0	2	3
1978	3	3	3	3	1	0	2	3
1979	3	2	3	3	1	0	1	3
1980	3	2	3	3	1	0	1	2
1981	3	3	3	3	1	0	1	2
1982	3	3	3	3	1	0	1	2
1983	3	2	3	3	1	0	1	2
1984	3	2	3	3	1	0	1	2
1985	2	2	2	3	1	0	1	2
1986	2	2	2	3	1	0	1	2
1987	2	2	2	3	1	0	1	2
1988	2	2	2	3	1	0	1	2
1989	2	2	2	3	1	0	1	2
1990	2	2	1	2	1	0	1	2
1991	2	2	1	2	1	0	1	2
1992	2	1	1	2	1	0	1	1
1993	1	1	1	2	1	0	1	1
1994	1	1	1	2	1	0	1	1
1995	1	1	1	2	1	0	1	1
1996	1	1	1	2	1	0	1	1
1997	1	1	1	2	1	0	1	1

Source: Dix (1994), p. 443 (1966-1991); Tom Bruneau, Maria Rasmussen and Scott Tollefson (1992-1998)

Table 1 (contd)

Military Intervention (MI) Scores: Latin America, 1996-1997

YEAR	Guatemala	Haiti	Honduras	Mexico	Nicaragua	Panama	Paraguay	Peru
1966	2	2	3	1	2	2	3	2
1967	2	2	3	1	2	2	3	2
1968	2	2	3	1	2	2	3	3
1969	2	2	3	1	2	3	3	3
1970	3	2	3	1	2	3	3	3
1971	3	2	3	1	2	3	3	3
1972	3	2	3	1	2	3	3	3
1973	3	2	3	1	2	3	3	3
1974	3	2	3	1	2	3	3	3
1975	3	2	3	1	2	3	3	3
1976	3	2	3	1	2	3	3	3
1977	3	2	3	1	2	3	3	3
1978	3	2	3	1	2	3	3	3
1979	3	2	3	1	2	3	3	2
1980	3	2	3	1	2	3	3	2
1981	3	2	3	1	2	3	3	2
1982	3	2	3	1	2	3	3	2
1983	3	2	3	1	2	3	3	2
1984	3	2	2	1	2	3	3	2
1985	3	2	2	1	2	3	3	2
1986	2	3	2	1	2	3	3	2
1987	2	3	2	1	2	3	3	2
1988	2	3	2	1	2	3	3	2
1989	2	2	2	1	2	3	3	2
1990	2	2	2	1	2	1	2	2
1991	2	2	2	1	2	1	2	2
1992	2	2	1	1	2	1	2	2
1993	2	2	1	1	2	1	2	2
1994	1	2	1	1	2	1	2	2
1995	1	2	1	1	2	1	2	2
1996	1	2	1	1	2	1	2	2
1997	1	2	1	1	2	1	2	2

Table 1 (contd)

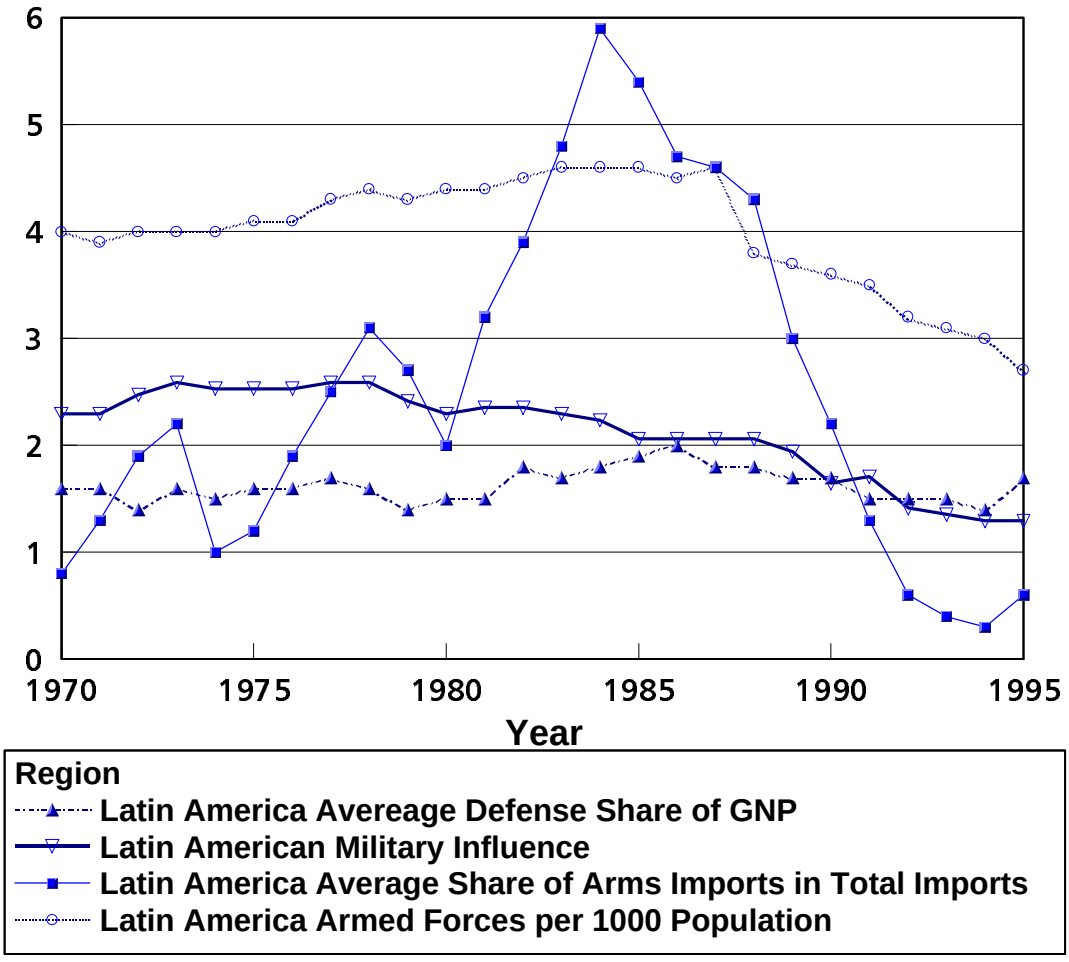
Military Intervention (MI) Scores: Latin America, 1996-1997

YEAR	Uruguay	Venezuela
1966	0	1
1967	0	1
1968	1	1
1969	1	1
1970	1	1
1971	1	1
1972	2	1
1973	2	1
1974	3	1
1975	3	1
1976	3	1
1977	3	1
1978	3	1
1979	3	1
1980	3	1
1981	3	1
1982	3	1
1983	3	1
1984	3	1
1985	2	1
1986	2	1
1987	2	1
1988	2	1
1989	1	1
1990	1	1
1991	1	1
1992	1	2
1993	1	1
1994	1	1
1995	1	1
1996	1	1
1997	1	1

Source: For 1970-1991, Dix (1994), p. 443 (1966-1991). For 1992-1995: Tom Bruneau, Maria Rasmussen and Scott Tollefson (1992-1998).

When the regions defense and manpower are compared directly with the average military influence index for the region (Figure 5), it is apparent that: (a) a number of factors other than the military's control over the budget process are at work; and/or (b) if the military influence factor is operative, it is one of equilibration over time with a fairly long lag structure.

Figure 5
Latin America:
Military Influence and Defense Expenditures, Foreign Procurement and Manpower



Main features:

- Peak in military influence (MI) in the mid-late 1970s with subsequent gradual but steady decline.

- Increase in defense share of GNP, armed forces and arms imports to mid-1980s with subsequently gradual decline in share of GNP. Sharper declines in armed forces and arms imports occurred from the mid-1980s onward.

Model Construction

The estimated form of the ECM model specifies that defense expenditures in any particular Latin American country are a function of internal and external (regional forces). Internally defense expenditures are assumed to be affected by the military influence index (MI) noted above as well as the resource base (movements in real GNP and the population). It is also assumed that government allocations to defense may be affected by changes in military influence throughout the region as well as shifts in regional defense allocations.

The ECM model allows identification of the long-run relationship (if any) between these variables and defense allocations. In addition, the model is suggestive of the manner in which these variables force long-run adjustment in defense allocations to restore that equilibrium relationship. One advantage of this model is that it provides an objective operational means of identifying the optimal lag structure through which impacts (say changes in military influence) carry over into future budgetary decisions. Here we have used the (ARDL) procedure developed by Pesaran & Pesaran (1997). Essentially the procedure begins with the selection of a fairly long lag period. The Schwartz Bayesian criterion is then used to determine the optimal lag pattern. The program then provides estimates of the error correction model (ECM) which corresponds to the selected ARDL model.

Results

Estimates were made with economic data from the World Bank (1997), and military data from the U.S. Arms control and Disarmament agency. (ACDA, 1996). The ratios of military expenditures (military expenditures share of GNP etc) were then applied to the World Bank data to derive real defense expenditures, non-defense expenditures, arms imports and armed forces. Defense expenditures are in constant (1987) domestic currency prices while armed forces are in thousands.

Argentina

- Historically, military influence has played a decisive role in affecting allocations to the Argentine military (Table 2). This variable was highly significant in the total defense expenditure equation as well as that of the size of the armed forces and arms imports. This variable together with regional defense expenditures account for nearly 60% of the fluctuations in the defense budget. Both the military influence index and regional defense expenditures form a long-run relationship with the country's defense budget.

- The armed forces also reflect this set of short- and longer run forces, but in this case only a third of the variance in armed forces can be accounted for by changes in the military influence and regional shifts in the size of the armed forces.

Table 2
Argentina, Brazil, and Chile: Factors Affecting Military Allocations, 1970-1995

	Short-run Impacts					Longer Term adjustment (Error Correction Term)	
Country	Military Influence		Resources		Regional Defense	t-value	adj r^2
	Domestic	Regional	GNP	Population	Allocations		
Argentina							
Defense Expenditures	+**				+**	-2.02*	0.580
Non-Defense Expend	ins	(-)**				-3.28**	0.725
Armed Forces	+**				+**	-2.34**	0.327
Arms Imports	+**				+**	none	0.503
Brazil							
Defense Expenditures	+**		+*			-3.78**	0.658
Non-Defense Expend			+**	+*		none	0.671
Armed Forces			+**		+**	-9.87**	0.893
Arms Imports		+**	+**			none	0.412
Chile							
Defense Expenditures	+**	ins				3.05**	0.749
Non-Defense Expend			+**			none	0.286
Armed Forces	+**				+**	-0.09	0.907
Arms Imports		+**	+**			0.15	0.415

Notes: ** = significant at the 95% level; * = significant at the 90% level; ins = not significant at the 90% level. Resources measured by real Gross National Product (GNP). Expenditure whole. Regional military influence: For Argentina, the Brazilian military influence index. For

Brazil, and Chile, the average military influence index for Latin America as a whole. Military data from US Arms Control and Disarmament Agency, World Military Expenditures and Arms Transfers, (various issues). Economic data from World Bank, World Development Indicators militarization = average defense expenditures share in GNP or average armed forces per 1000 population or average share of arms imports in total imports for the Latin American region as a 1997. Imilitary Influence Index: For 1970-1991, Dix (1994), p. 443 (1966-1991). For 1992-1995, Tom Bruneau, Maria Rasmussen and Scott Tollefson (1992-1998).

- Increased military influence does not appear to affect non-defense allocations in Argentina. Instead these expenditures are reduced in response to increased allocations to defense throughout the region.

- Clearly the country's resource base (real GNP or population) has had little or no affect on defense allocations. Because of the absence of a firm link to the underlying economy, defense expenditures have fallen sharply with the restoration of democracy and the lowering of military budges throughout the region.

Brazil

- Unlike Argentina the underlying resource base has had a major impact on allocations to the Brazilian military, affecting defense expenditures and arms imports in both the short- and long-term (Table 2). While the resource base also affects arms imports this link is not long term, but instead confined to short-run changes in foreign arms acquisition in response to movements in the underlying resource base.

- Another important contrast to Argentina involves the response of Brazilian policy makers to shifts in regional defense expenditures. While this factor affected the three main areas of Argentinean defense allocation, it appears to only influence movements in the size of Brazil's armed forces. Increases in regional military personnel together with Brazilian Gross National Product explain nearly 90 percent of the variance in the Brazilian armed forces.

- In addition to the resource base the military influence index is highly significant in affecting both short and longer-term allocations to total defense expenditures. These variables account for around 65 percent of the variance in the Brazilian defense budget.

- Finally Brazilian arms imports appear to reflect the country's underlying resource base. There are also sensitive to the influence of the military in Argentina with these two variables forming a long-run pattern in accounting for a little over 40 percent of the variance in foreign arms purchases.

Chile

- Chile's allocations (Table 2) to the military reflect a blend of factors present in Argentina and Brazil. Like Brazil, domestic resources play an important

role in affecting arms imports, but like Argentina, the military's influence dominates the overall defense budget. As with Brazil, the government's overall allocations to defense seem to be relatively unaffected by regional shifts in defense expenditures.

- Similar to Brazil and Argentina, the country's defense expenditures established a long-run pattern with its underlying determinants. However, in Chile's case, the effect of military influence on overall defense expenditures is somewhat greater than in either Brazil or Argentina. This variable alone accounts for slightly over two thirds of the variance in the country's defense budget.

- The size of the armed forces is also largely affected by the military influence index. Together with shifts in the size of the armed forces in Latin America these factors account for slightly over 90 percent of the variations in the country's armed personnel. However, no long-run relationships exist between these variables.

- For arms imports, increases the military's influence in the region tends to stimulate increased flows of armaments, as does the general resource position (GNP) of the country. As with the armed forces, no long-run relationships appear to characterize the pattern of foreign arms acquisition.

In sum, Argentina appears to have the most stable long-term linkages between the various allocations to the military and the factors affecting this allocation. Brazil follows with the defense budget in Chile the only aspect of defense allocations linked in a long-term causal relationship. In most cases at least half the observed budgetary patterns can be explained by several factors. Also, it does not appear that increased military influence necessarily results in falling allocations to non-defense activities. Other than this generalization, however, the diversity of these relationships across countries makes it difficult to derive broad generalizations about the factors affecting the various allocations to defense. Clearly much of this diversity stems from the different manner in which changes in the military's influence has affected the defense budgetary decisions (Figures 6-8).

Summary

The results for these three countries along with the others examined are summarized in Table 3. Roughly corresponding to the theories of Latin American defense expenditure outlined above: (a) Budgetary Inertia (BI), (b) Residual Military Influence (RMI), (c) Regional/Internal Conflict (RIC) and (d) Multi-Factor (MF), several distinct defense allocation country groups emerge: (1) Those dominated by the Military Influence Index; (2) countries where domestic resource constraints are the main consideration and (3) countries responding to shifts in regional militarization (measured either by allocations or the military influence index). A fourth group includes those countries whose defense allocations are somewhat mixed in that they are affected by a combination of two or three of these factors with none dominant.

- Argentina, Guatemala and Panama fall in the first group. In general defense expenditures in these countries are not significantly constrained by domestic resource considerations, but instead are also moderately affected by shifts in regional allocation patterns. Short-run considerations dominate Guatemalan and Panamanian defense allocations, ruling out the RMI model. Only Argentina's defense budget adjusting to longer run forces as assumed by the RMI model.

Figure 6

Argentina: Military Influence and Defense

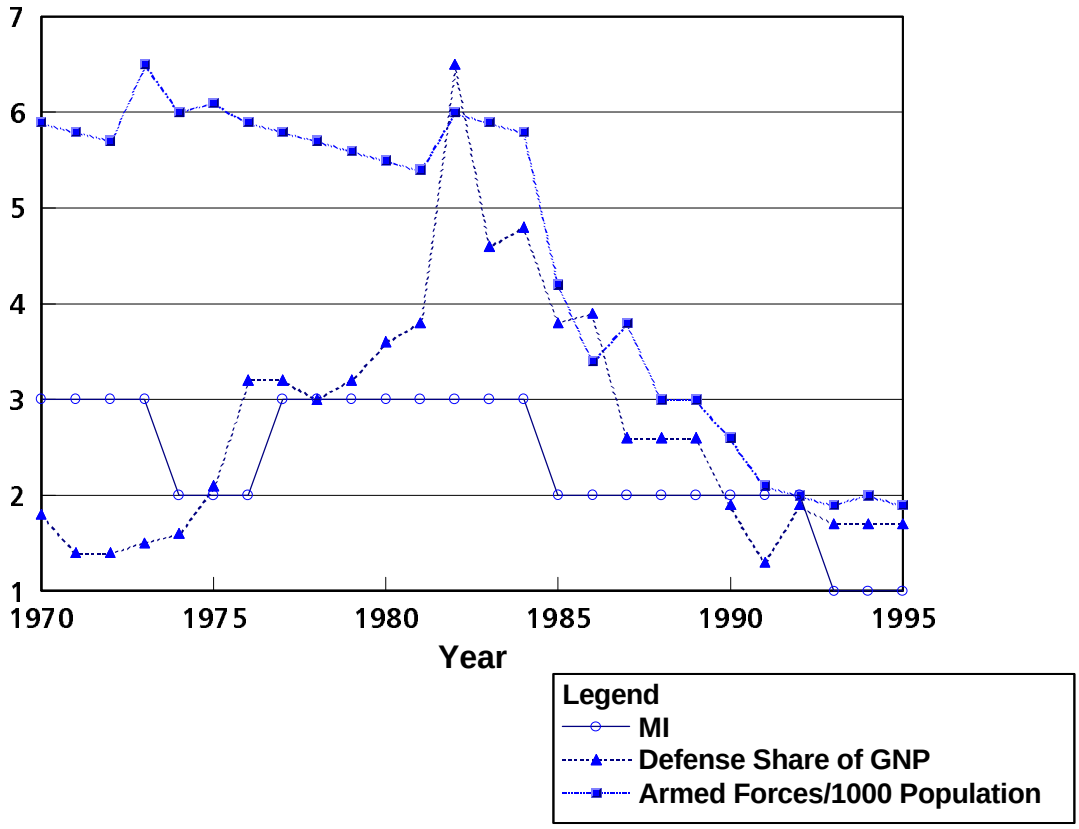


Figure 7

Brazil: Military Influence and Defense

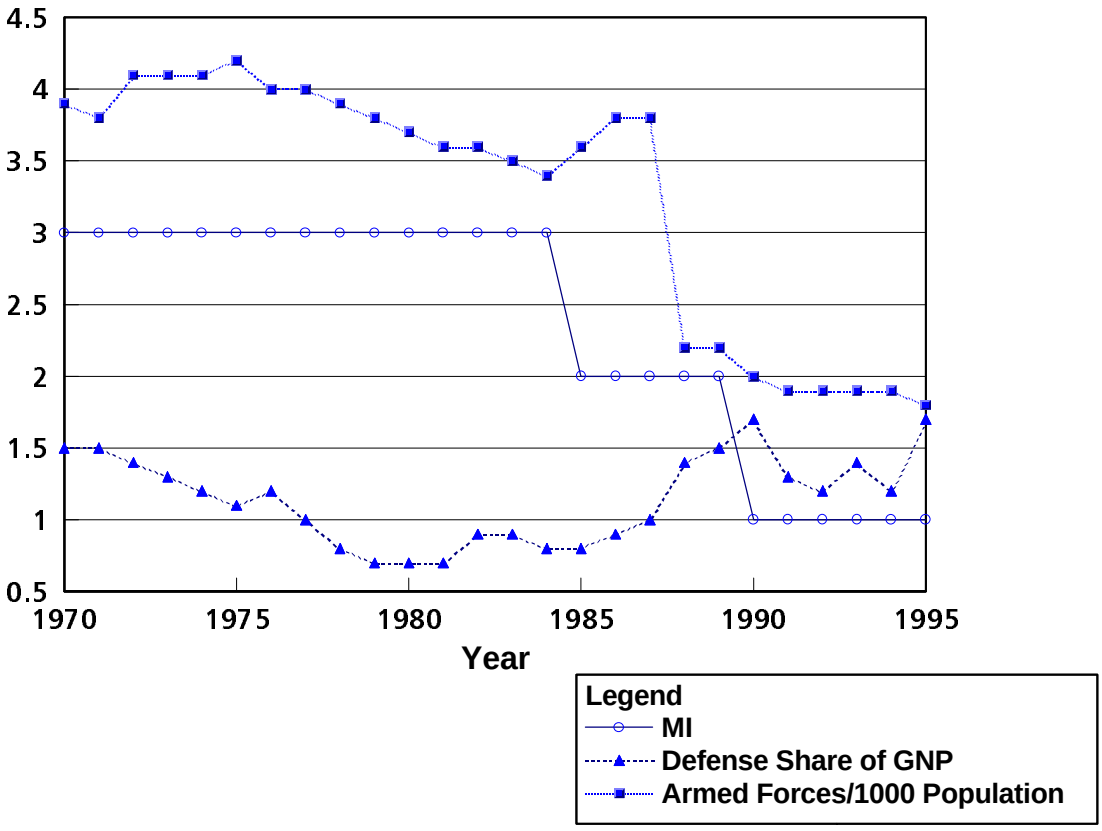


Figure 8

Chile: Military Influence and Defense

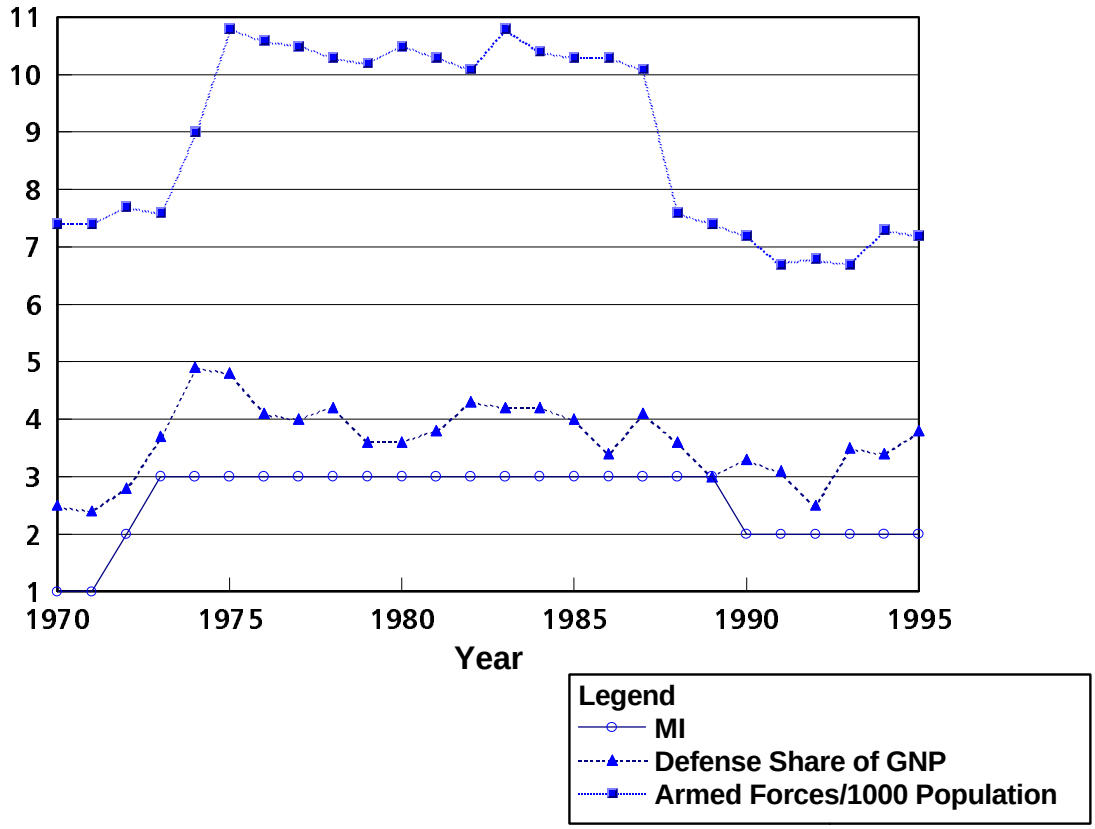


Table 3
Characterizations of Military Allocations in Latin America

Dominant Country	Strength of Main Determinants			Primary Period of Impact		Model
	Military Influence	Domestic s Resources	Regional Factors	Long-run	Short-run	
Strong MI						
Argentina	S		S	X		RMI
Guatemala	S		M		X	0T
Panama	S	M	M		X	OT
Domestic Res						
Brazil	W	S	M	X		BI
Paraguay	W	S	M	X		BI
Regional						
Ecuador	W	M	S		X	RIC
Honduras		W	S		X	RIC
El Salvador			S		X	RIC
Mixed						
Chile	M	M	M		X	MF
Venezuela	W	M	W	X		MF
Haiti	W	M	W	X		MF
Peru	M		M	X		MF
Uruguay		M	W	X		MF
Dominican Rep		M	W	X		MF
Bolivia		W	M	X		MF
No Domestic						
Argentina	S		S	X		RMI
Guatemala	S		M		X	OT
El Salvador			S		X	RIC
No MI						
Honduras		W	S		X	RIC
El Salvador			S		X	RIC
Uruguay		M	W	X		MF
Dominican Rep		M	W	X		MF
Bolivia		W	M	X		MF
All Three Present						
Brazil	W	S	M	X		BI
Paraguay	W	S	M	X		BI

Venezuela	W	M	W	X		MF
Haiti	W	M	W	X		MF
Panama	S	M	M		X	OT
Ecuador	W	M	S		X	RIC
Chile	M	M	M		X	MF

Notes: Based on Tables 2-6. S = Strong, all three categories affected; M = moderate 2 categories affected; W = Week 1 category affected. Dominant Model: BI = budgetary intertia; RMI = residual military influence; RIC = regional/internal conflict; MF = multifactor; OT = other.

- Brazil and Paraguay are the only countries where domestic resource considerations affect all three main defense allocation areas. Defense allocations in both countries are moderately affected by regional considerations with the military influence index playing a minor role in their budgetary decisions. Defense expenditures in both countries form long-run patterns with their underlying determinants making their adjustments consistent with the BI model's assumptions.

- Ecuador, Honduras and El Salvador are primarily affected by regional militarization factors. For these countries domestic resource constraints play a lesser role, with the military influence index having little or no impact on defense decisions. Defense considerations are dominated by short-run adjustments. Presumably these countries defense expenditures consist mainly of a rapid response to perceived internal/external threats as assumed by the RIC model.

- No one factor dominates the military expenditure decisions of the final group of countries. Nearly all of the countries defense budgets are moderately affected by their respective resource bases, with regional considerations generally less important. With the exception of Chile, defense expenditures in these countries have long term linkages with their underlying determinants. The defense allocations of these countries can best be described by the MF or multi-factor model.

Several other generalizations are possible:

- Three countries, Argentina, Guatemala and El Salvador have no domestic constraints on their defense allocations. However defense expenditures in each country are strongly affected by either the military's influence or concern over regional militarization. All three countries were strongly or moderately affected by regional considerations.

- The military did not influence defense expenditures in five countries: Honduras, El Salvador, Uruguay, Dominican Republic and Bolivia. For those countries strongly affected by regional considerations, no long-run defense patterns were established. The remaining countries experience moderate to weak domestic and regional effects did establish longer run linkages to defense.

- Finally in those countries where all three factors influenced defense expenditures, whose with weak military influence formed long-run relationships to defense. Those affected more strongly by the military (or another factor) did not form long-run patterns with defense.

Conclusions

The results presented above suggest that in most cases a high proportion of national allocation to the military can be explained by a relatively small number of variables. While our earlier (1988) study did not directly test for the effect of military influence or regional militarization, the lower proportion of defense allocations accounted for by economic factors suggest that these variables have likely increased in importance in recent years.

On the other hand, the increase in military influence and regional militarization may make generalizations concerning defense expenditures (and their forecast) difficult. Of particular interest is the great diversity in the manner in which Latin American countries go about formulating their defense budgets. Even in a single country such as Argentina, great differences have been found in the budgetary priorities of different military administrations (Looney and Frederiksen 1987). There is no reason why a similar pattern would not exist in a number of other Latin American countries.

Clearly, general explanations such as the movement toward democracy with lingering military influence in the 1980s and/or the dismal economic performance during this period cannot adequately account for general regional patterns such as the increased share of national resources devoted to the military. Instead these patterns are most likely the chance result of aggregation.

In terms of future research, the predominance of long term associated with defense allocations suggests that the error-correction methods used here could produce reliable forecasts of future military budgets. First, however, feedback effects from national defense allocations to regional patterns would need to be established (Looney, 1991). Also, several individual country explanations could no doubt be improved with the inclusion of specific variables—the civil war in El Salvador for instance. While the inclusion of these factors is not likely to change the main conclusions of the study, they would help minimize any remaining spurious correlations.

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